

# PATENT ABSTRACTS OF JAPAN

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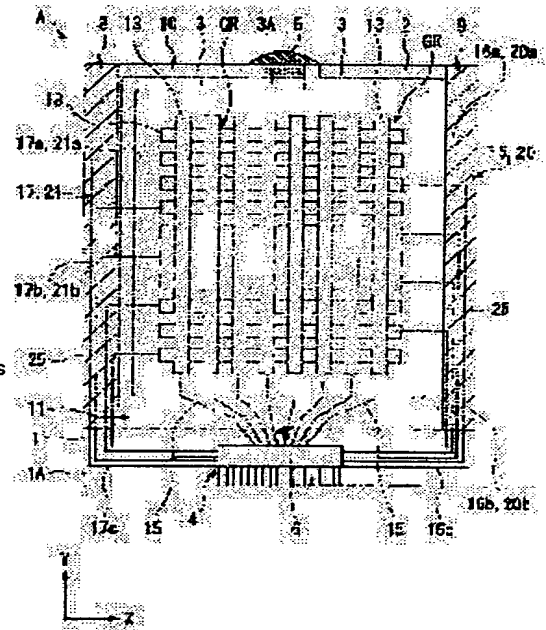
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## (54) OPTOELECTRONIC DEVICE AND ELECTRONIC APPARATUS

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an optoelectronic device capable of making resistance of laying-wirings which are provided in frame edge parts of the circumferences of a picture display area to be low and in which display having the same brightness are made possible at an electrode means being at a position close to a driving circuit means and an electrode means being at a position distant from the driving circuit means.

**SOLUTION:** In this device, laying-wirings 20, 21 for connecting a driving circuit means 6 and electrodes are formed on the substrate of one side corresponding to frame edge areas positioned at both edge parts of electrodes formed along either direction of plural electrodes 13, 18 arranged in a matrix shape and laying-sub-wirings 16, 17 are formed on the frame edge parts of the substrate of a side in which the laying-wirings are not formed so as to be confronted with the laying-wirings and the laying-wirings and the laying-sub-wirings confronting with each other of both substrates are brought into conduction by upper and lower conductive members interposed between the both substrates.



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CLAIMS

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[Claim(s)]

[Claim 1] While opposite arrangement of the substrate in which two or more signal-electrode means were formed, and the substrate in which two or more scanning electrode means were formed is carried out, two or more signal-electrode means and two or more scanning electrode means are arranged in the shape of a plane view matrix and an image display field is divided. The drive circuit means for driving the aforementioned signal-electrode means and the aforementioned scanning electrode means to the aforementioned substrate is established. It comes to connect with each signal-electrode means or each scanning electrode means through two or more leading-about wiring with which this drive circuit means was formed on each aforementioned substrate. The leading-about wiring for connecting the aforementioned drive circuit means and the aforementioned electrode means on a substrate corresponding to which or the frame field located in the edge side of the electrode which meets \*\* on the other hand is formed among two or more electrodes arranged in the shape of [aforementioned] a matrix. Take about so that the frame field of a near substrate in which the aforementioned leading-about wiring is not formed may be countered with the aforementioned leading-about wiring, and subwiring is formed. Electro-optics equipment which flows by the vertical flow member to which it took about with the leading-about wiring of both the aforementioned substrates which carries out phase opposite, and subwiring intervened among both substrates, and is characterized by the bird clapper.

[Claim 2] The electrode means by the side of infestation of the substrate of aforementioned another side of the electrode means by the side of a column is respectively formed in aforementioned one substrate. The aforementioned leading-about secondary wiring is formed in the frame field formed in the right-and-left both sides of aforementioned one substrate. While leading-about wiring of the electrode means by the side of infestation is formed in the frame field of the right-and-left both sides of the substrate of aforementioned another side and leading-about secondary wiring of aforementioned one substrate and leading-about wiring of the substrate of aforementioned another side which counters this are connected by the aforementioned vertical flow member. The electrode means by the side of the column of aforementioned one substrate is connected to a drive circuit means through the connection wiring by the side of the column formed on aforementioned one substrate. Electro-optics equipment according to claim 1 with which it connects with a drive circuit means through the connection wiring by the side of the horizontal train formed on aforementioned one substrate, and leading-about secondary wiring of aforementioned one substrate is characterized by the bird clapper.

[Claim 3] The electrode means by the side of a column is respectively formed in the substrate of aforementioned another side for the electrode means by the side of infestation of aforementioned one substrate. The leading-about wiring connected to the electrode means by the side of the aforementioned infestation is formed in the frame field formed in the right-and-left both sides of aforementioned one substrate. The leading-about secondary wiring for electrode meanses by the side of the aforementioned infestation is formed in the frame field of the right-and-left both sides of the substrate of aforementioned another side. While leading-about wiring of aforementioned one substrate and leading-about secondary wiring of the substrate of aforementioned another side which counters this are connected by the aforementioned vertical flow member. The electrode means by the side of the column of the substrate of aforementioned another side is connected to a drive circuit means through the connection wiring by the side of the column formed on aforementioned one substrate. Electro-optics equipment according to claim 1 with which it connects with a drive circuit means through the connection wiring by the side of the horizontal train formed on aforementioned one substrate, and leading-about wiring of aforementioned one substrate is characterized by the bird clapper.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to electro-optics equipment and electronic equipment, and relates to the technology which made special structure wiring structure of the portion especially called the frame field of an image display field periphery.

[0002]

[Description of the Prior Art] In portable electronic equipment, such as a notebook computer, carried type electronic equipment, and a wrist watch, etc., the liquid crystal display is widely used as a means to display various kinds of information. Drawing 10 shows in simple the example of 1 structure of the passive matrix type liquid crystal display used widely in this kind of liquid crystal display, the liquid crystal display 100 of this example opens a cell gap with the transparent suitable substrates 101 and 102 of a couple, opposite arrangement is carried out, and liquid crystal 105 is enclosed between a substrate 101 and 102 by the sealing agent 103 arranged at the periphery portion of the substrates 101 and 102 which counter. Moreover, two or more band-like electrodes (segment electrode) 106 which become an inside by the side of the liquid crystal of the aforementioned substrate 101 from a transparent electrical conducting material are formed so that it may extend separately lengthwise [ of drawing 10 ], and it is formed so that it may extend in the direction (drawing 10 (a) longitudinal direction) in which the aforementioned electrode 106 and two or more band-like electrodes (common electrode) 107 which become an inside by the side of the liquid crystal layer of a substrate 102 from a transparent electrical conducting material cross at right angles. Two or more electrodes 106 and two or more electrodes 107 are arranged in the shape of a plane view matrix.

[0003] Next, it was pulled out from two or more previous electrodes 106 of each, lengthen about, and a driver element 109 is connected to the end section side of the aforementioned substrate 101 through wiring 108. It was pulled out from two or more previous electrodes 107 of each, lengthen about, and a driver element 111 is connected to the left end section side of the aforementioned substrate 102 through wiring 110. It is constituted so that the state of the light which passes a liquid crystal layer may be controlled by controlling separately the orientation state of a liquid crystal molecule where two driver elements 109 and 111 exist in a part for the intersection of two or more electrodes 106 and 107 arranged in the shape of [ previous ] a matrix and image display may be possible. Therefore, let the field where the electrode has arranged in the shape of a matrix be an image display field. In addition, although the liquid crystal display 100 shown in drawing 10 was equipped with the orientation film, the polarizing plate, etc. other than the structure element explained previously, the back light was prepared when a liquid crystal display 100 was a penetrated type, the light filter was prepared when it was a color display type, and the reflecting layer was prepared when it was a reflected type, in drawing 10, explanation of these elements was omitted for simplification of explanation.

[0004] If shown in the liquid crystal display 100 of composition of being shown in drawing 10, since a driver element 111 is formed in the side edge section side of a substrate 102, there is a fault which needs the installation space of a driver element 111 for the side side of an actual image display field. Moreover, with the structure shown in drawing 10, the problem which cannot arrange an image display field is in the center section of the liquid crystal display 100. Thus, if it is in an information management system with an especially small cellular phone etc. when an image display field cannot be installed in the center section of the liquid crystal display 100, the width of face of the right-and-left both-sides portion of an image display field will differ, and there is a problem which will induce big restrictions due to screen arrangement.

[0005] From the above backgrounds, to drawing 11, this invention persons did development research of the liquid crystal display in which outline structure is shown, and have proposed it. If shown in the liquid crystal display 120 shown in drawing 11 While it considers as the same breadth where opposite arrangement of the substrates 121 and 123 of the couple which pinches liquid crystal is carried out, and the dip of the substrate 123 of another side is short formed rather than the dip of one substrate 121. The form of two or more electrodes 122 by the side of a column (signal electrode) is carried out to one substrate 121 among matrix-like electrodes. Two or more electrodes 125 by the side of infestation of the substrate 123 of another side (scanning electrode) are formed, and the frame fields 126 and 127 of equal width of face are mostly established in the both sides of the field where these electrodes are arranged in the shape of a plane view matrix. And it lengthens about by turns from the edge of two or more electrodes 125 by the side of infestation of the flank side of the substrate 121 corresponding to both the frame fields 126 and 127, wiring 128 is pulled out, and it considers as the structure which it comes to connect with the driver element 130 which these prepared on the edge of one substrate 121. moreover, the vertical flow of illustration abbreviation which is lengthened about from the electrode 122 by the side of two or more columns formed in the substrate 123 side of another side and by which wiring 131 is arranged at the boundary portion of both the substrates 121 and 123 — after wiring from a substrate 123 side through a member etc. at a substrate 121 side, it connects with the driver element 130. In addition, what is shown with a sign 132 in drawing 11 is the flexible substrate connected to the driver element 130.

[0006]

[Problem(s) to be Solved by the Invention] While the image display field had been arranged in the display center section since the frame fields 126 and 127 of width of face [ both sides / substrate ] were formed if shown in the liquid crystal display 120 of the structure shown in drawing 11, it was what has the outstanding feature that the driver element which is shown in drawing 10, and which was conventionally required for two with structure is collected by one. In addition, although drawing 11 has indicated widely the frame fields 126 and 127 of the right-and-left both sides of an image display field for simplification of explanation, it is far narrow rather than the frame fields 126 and 127 are shown in drawing 11 in actual equipment, since it is possible to lengthen about and to form wiring thinly, for example, since it can form in about several mm, narrow picture frame-ization can be attained with the structure shown in drawing 11. However, it had the problem which was connected to the electrode 125 in the position which was connected to the electrode 125 of the position near [ if shown in the liquid crystal display 120 shown in drawing 11, since the distance from the electrode 125 of the plurality by the side of infestation to a driver element 130 differs for every electrode ] a driver element 130, and which lengthen d about and is distant from wiring 128 and a driver element 130 and from which it will lengthen about and the length of wiring 128 will differ sharply. Wiring resistance comes to differ for every electrode that it seems that the length of wiring 128 differs sharply. it these-\*\*\*\*\* — Since the electric field which the electrode 125 of a position distant from a driver element 130 gives to liquid crystal come to differ from the electric field which the electrode 125 of the position near a driver element 130 gives to liquid crystal delicately when especially a liquid crystal display is a passive matrix type thing Ev n if it is carrying out drive control of each electrode so that the same electric field can be impressed, there is a problem of having possibility that the display of the same luminosity cannot be performed for every electrode. Moreover, since it became the inclination whose driver voltage wave becomes easy to become blunt when resistance of a wiring portion impressed driver voltage to a big electrode, there was a possibility that the actual value of the voltage impressed to liquid crystal might change.

[0007] this invention was made in view of the above-mentioned trouble, can make low resistance-ization of the leading-about wiring formed in the frame portion around an image-display field, makes \*\*\*\* of a drive wave as the same as possible in the electrode means of the position near a drive circuit means, and the electrode means of the distant position, and aims at offer of the electro-optics equipment which could be made to perform the display of the same luminosity also in which electrode means. furthermore, this invention — the right-and-left both sides around an image display field — setting — etc. — even if it prepares the frame field of width of face, it aims at offer of electro-optics equipment which can acquire the same effect as the above-mentioned thing, and can also attain narrow picture frame-ization Next, this invention aims at offer of electronic equipment equipped with the above outstanding electro-optics equipments.

[0008]

[Means for Solving the Problem] In order that the electro-optics equipment of this invention may solve the aforementioned technical problem, opposite arrangement of the substrate in which two or more signal-electrode meanses were formed, and the substrate in which two or more scanning electrode meanses were formed is carried out. While two or more signal-electrode meanses and two or more scanning electrode meanses are arranged in the shape of a plane view matrix and an image display field is divided The drive circuit means for driving the aforementioned signal-electrode means and th aforementioned scanning electrode means to the aforementioned substrate is established. It comes to connect with each signal-electrode means or each scanning electrode means through two or more leading-about wiring with which this drive circuit means was formed on each aforementioned substrate. The leading-about wiring for connecting the aforementioned drive circuit means and the aforementioned electrode means on a substrate corresponding to which or the frame field located in the edge side of the electrode which meets \*\* on the other hand is formed among two or more electrodes arranged in the shape of [ aforementioned ] a matrix. It flows by the vertical flow member to which it took about so that the frame field of a near substrate in which the aforementioned leading-about wiring is not formed might be counter d with the aforementioned leading-about wiring, and subwiring was formed, it took about with the leading-about wiring of both the aforementioned substrates which carries out phase opposite, and subwiring intervened among both substrates, and a bird clapper is carried out as the feature.

[0009] Since it is formed so that the substrate in which takes about with leading-about wiring and subwiring carries out phase opposite may be countered, and they are connected by the vertical flow member, it lengthens about, and wiring resistance can be reduced rather than it wires by the wiring independent. Therefore, it is rare to cause \*\*\*\* of a signal wave form, and a display is possible, even if a drive circuit means impresses a signal to which scanning electrode means or signal-electrode means of a position of an image display field, without producing the nonuniformity of a luminosity.

[0010] As for this invention, the electrode means by the side of infestation of the substrate of aforementioned another side of the electrode means by the side of a column is respectively formed in aforementioned one substrate. The aforementioned leading-about secondary wiring is formed in the frame field formed in the right-and-left both sides of aforementioned one substrate. While leading-about wiring of the electrode means by the side of infestation is formed in the frame field of the right-and-left both sides of the substrate of aforementioned another side and leading-about secondary wiring of aforementioned one substrate and leading-about wiring of the substrate of aforementioned another side which counters this are connected by the aforementioned vertical flow member It connects with a drive circuit means through the connection wiring by the sid of the column by which the electrode means by the side of the column of aforementioned one substrate was formed on aforementioned one substrate, it connects with a drive circuit means through the connection wiring by the side of the horizontal train by which leading-about secondary wiring of aforementioned one substrate was formed on aforementioned one substrate, and it is characterized by the bird clapper. Since it is formed so that the substrate which was connected to the electrode means and in which takes about, and takes about with wiring and subwiring carries out phase opposite may be countered, and they are connected by the vertical flow member, it lengthens about, and wiring resistance can be reduced rather than it wires by the wiring independent. Therefore, it is rare to cause \*\*\*\* of a signal wave form, and a display is possible, even if a drive circuit means impresses

a signal to the electrode means of which position of an image display field, without producing the nonuniformity of a luminosity.

[0011] As for this invention, the electrode means by the side of a column is respectively formed in the substrate of aforementioned another side for the electrode means by the side of infestation of aforementioned one substrate. The leading-about wiring connected to the electrode means by the side of the aforementioned infestation is formed in the frame field formed in the right-and-left both sides of aforementioned one substrate. The leading-about secondary wiring for electrode means by the side of the aforementioned infestation is formed in the frame field of the right-and-left both sides of the substrate of aforementioned another side. While leading-about wiring of aforementioned one substrate and leading-about secondary wiring of the substrate of aforementioned another side which counters this are connected by the aforementioned vertical flow member. It connects with a drive circuit means through the connection wiring by the side of the column by which the electrode means by the side of the column of the substrate of aforementioned another side was formed on aforementioned one substrate, it connects with a drive circuit means through the connection wiring by the side of the horizontal train by which leading-about wiring of aforementioned one substrate was formed on aforementioned one substrate, and it is characterized by the bird clapper. Since it is formed so that the substrate which was connected to the electrode means and in which takes about, and takes about with wiring and subwiring carries out phase opposite may be countered, and they are connected by the vertical flow member, it lengthens about, and wiring resistance can be reduced rather than it wires by the wiring independent. Therefore, it is rare to cause \*\*\*\* of a signal wave form, and a display is possible, even if a drive circuit means impresses a signal to the electrode means of which position of an image display field, without producing the nonuniformity of a luminosity.

[0012] The frame field of width of face [ both sides / right-and-left / of the aforementioned image display field ] is formed, and this invention is characterized by the bird clapper. By the frame field of width of face [ both sides / right-and-left / of an image display field ] being formed, an image display field can be arranged in the center section of equipment. Moreover, it is rare to cause \*\*\*\* of a signal wave form like the point on it, and the electro-optics equipment whose display is possible can be offered, without producing the nonuniformity of a luminosity.

[0013] the substrate top in which, as for this invention, the aforementioned leading-about secondary wiring formed this leading-about secondary wiring — setting — the above — it is characterized by considering as the isolated wiring to which which electrode means is not connected. Since wiring resistance is reduced by lengthening about, drawing subwiring about and flowing with wiring, the electrode means by the side of the substrate which lengthened about and formed subwiring does not have the need of connecting.

[0014] this invention is characterized by the bird clapper from the thing which the aforementioned vertical flow means made scatter an electric conduction particle to the interior of an insulating resin layer for two or more minutes. Although what specifically scattered the electric conduction particle to the interior of an insulating resin layer for two or more minutes is applicable as a vertical flow member, if it is the thing of this structure, what is generally widely used as vertical flow material for liquid crystal displays etc. can be used. A vertical flow member is put by the substrate of a couple, it pushes mutually, an internal electric conduction particle is lengthened about, and a vertical flow is easily completed by wiring or lengthening about and putting with subwiring.

[0015] While considering as the frame field in which a part of field in which the sealing layer by which it was placed between the periphery sections between the substrates of the aforementioned couple came to enclose liquid crystal between the substrates of a couple, and the aforementioned sealing layer was prepared took about this invention with the aforementioned leading-about wiring, and subwiring was formed. Two or more electric conduction particles are distributed inside the aforementioned sealing layer, and it takes about by these electric conduction particle, and takes about with wiring, the vertical flow of the subwiring is carried out, and it is characterized by the bird clapper. If a sealing layer is arranged also to the frame field in which it lengthens about and wiring is formed using that by which the electric conduction particle was distributed by the sealing layer, a sealing layer can adopt the composition which serves as a vertical flow member. this invention is characterized by sprinkling the gap agent for controlling the thickness of a liquid crystal layer to the aforementioned sealing layer. If the gap agent is distributed by the sealing layer, since substrates constitute a regular cell gap through a gap agent, a uniform cell gap, i.e., uniform liquid crystal layer thickness, is securable. Moreover, even if it lessens the gap agent which will be distributed to an image display field side if the gap agent is distributed by the sealing layer or does not distribute a gap agent to an image display field side, a uniform cell gap, i.e., uniform liquid crystal layer thickness, is securable. Such structure especially is effective in a small, the liquid crystal panel of the type which does not make a viewing area distribute a gap agent, for example, the liquid crystal display of a cellular phone etc., etc., liquid crystal display.

[0016] In two or more leading-about wiring formed in the aforementioned frame field, leading-about wiring width of face far [ among the electrode means connected with the aforementioned drive circuit means ] in position from the aforementioned drive circuit means for electrode means is made thicker than the leading-about wiring width of face for electrode means near the aforementioned drive circuit means in position, and this invention is characterized by the bird clapper. The display of an equal luminosity can do also to the electrode means of which position [ as opposed to / if it lengthens about and it comes it thick than the leading-about wiring width of face for electrode means near the aforementioned drive circuit means in position to be carried out the wiring width of face of wiring / an electrode means far in position ] which lengthens about, can make wiring resistance of wiring low, and exists in an image-display field connected to an electrode means are to a position distant from a drive circuit means.

[0017] this invention possesses 2 terminal type nonlinear element by which the aforementioned signal-electrode means has been arranged between the pixel polar zone formed for every pixel, and the aforementioned signal wiring section and the aforementioned pixel polar zone, and is characterized by the bird clapper. Even if a drive circuit means impresses a signal to the electrode means of which position of an image display field, the feature whose display is possible can be enjoyed also in the equipment of the structure of coming to provide 2 terminal type nonlinear element, without producing the nonuniformity of a luminosity.

[0018] Since it is characterized by the electronic equipment of this invention equipping one of the above with the electro-optics equipment of a publication as a display means, it has the feature whose display is possible, without producing the nonuniformity of a luminosity.

[0019]

[Embodiments of the Invention] Hereafter, this invention is not restrained by the gestalt of the following operations although the gestalt of operation of this invention is explained based on a drawing.

The plan with which "gestalt of the 1st operation" drawing 1 - drawing 4 applied this invention to the passive matrix type liquid crystal display (electro-optics equipment) and in which the gestalt of the 1st operation is shown and drawing 1 shows the whole liquid crystal display A structure, and drawing 2 take about the plan of one substrate of the aforementioned liquid crystal display A, the plan of the substrate of another side of the aforementioned liquid crystal display A and drawing 4 take about drawing 3, it takes about with wiring, and the cross-section structure for a of subwiring is shown. Moreover, in order to make each class and each part material into the size of the grade which can be recognized on a drawing, scales are made to have differed for each class or every each part material in each drawing. Opposite arrangement of one substrate 1 and the substrate 2 of another side is carried out, and, as for the liquid crystal display A of this gestalt, liquid crystal is enclosed among both substrates. More specifically, the substrate 1 and the sealing layer 3 which was located among two and has been arranged in the shape of a plane view abbreviation rectangle are formed, it is surrounded by substrates 1 and 2 and the sealing layer 3, and liquid crystal is enclosed with the periphery section side of substrates 1 and 2. Moreover, a part is formed in a side ( drawing 1 upper-limit section side) so that inlet 3A for liquid crystal pouring may arrive at the edge of substrates 1 and 2, and liquid crystal is enclosed by [ of the aforementioned sealing layer 3 ] closing this inlet 3A by the sealant 5.

[0020] Breadth (breadth in the plane view state where opposite arrangement of both the substrates 1 and 2 was carried out) in the state which shows in drawing 1 of aforementioned one substrate 1 and the substrate 2 of another side is made the same. The dip (dip shown in drawing 1) of one substrate 1 is formed for a long time a little rather than the substrate 2 of another side, the substrate 2 of another side is overflowed, while was prepared and the one chip type drive circuit means (drive circuit element) 6 is installed in the installation field 4 of the center of edge side 1A of a substrate 1. In addition, as shown in drawing 1, in the state where opposite arrangement of the substrates 1 and 2 was carried out, inside the sealing layer 3, two or more electrodes (electrode means) 13 mentioned later and two or more electrodes (electrode means) 18 are arranged in the shape of a matrix, and the rectangle-like image display field GR is formed of these electrodes. Next, the left-hand side frame field 8 is formed in the left-hand side portion of the image display field GR shown in drawing 1. The right-hand side frame field 9 is formed in the right-hand side portion of the image display field GR, and the upper frame field 10 is formed in the top portion of the image display field GR. The lower frame field 11 is formed in the bottom portion of the image display field GR, among those it considers as width of face [ fields / frame / 8 and 9 / of the right-and-left both sides of the image display field GR ].

[0021] Next, the electrode means formed in substrates 1 and 2, leading-about wiring, leading-about secondary wiring, etc. are explained in detail. In addition, although the electrode and wiring which are explained below are fundamentally formed from transparent electrical conducting materials, such as ITO (indium stannic-acid ghost), of course, you may constitute the leading-about wiring of these, and leading-about secondary wiring from metal wiring for the reduction in resistance. Although the arrangement structure of the electrode means currently formed in drawing 2 at aforementioned one substrate 1 is shown, by this gestalt, eight band-like electrodes 13 (electrode means) by the side of a column (Y side) are formed in the predetermined pitch so that the central site of a substrate 1 may be occupied. in addition — although drawing 2 showed only eight electrodes 13 for simplification of explanation, if it is shown in an actual liquid crystal display — screen resolution — in all — dozens of— 1000 — hundreds of electrodes are arranged Moreover, as shown also in drawing 1, let the field in which the aforementioned electrode 13 is installed be a field inside a sealing layer 3.

[0022] Next, the end section side (the drawing 1 side or soffit section side of drawing 2) of each electrode 13 is connected to the drive circuit element 6 through the connection wiring 15 formed on the substrate 1. moreover, on the right-hand side of the formation field of the electrode 13 on the substrate 1 shown in drawing 2 Take about so that it may correspond to the electrode 18 of an every other of two or more electrodes 18 by the side of the infestation formed in the substrate 2 side of another side later mentioned based on drawing 3 separately, and the subwiring 16 is formed. Also on the substrate 1 on the left-hand side of the formation field of an electrode 13, take about so that it may correspond to the remaining electrodes 18 of an every other of the electrodes 18 formed in the substrate 2 side of another side mentioned later similarly, and the subwiring 17 is formed. Each leading-about secondary wiring 16 and 17 is separately connected to the drive circuit element 6 on a substrate 1. In addition, wiring section 16a which each leading-about secondary wiring 16 extends in the same direction (the direction of X) as the electrode 18 later mentioned based on drawing 3, and is extended in a longitudinal direction in a substrate 1 top, Extension section 16b which is extended to lengthwise (the direction of Y) in a substrate 1 top, and is prolonged in the edge side of a substrate 1, It consists of connection 16c for being prolonged in a longitudinal direction (the direction of X) from the edge of a substrate 1, and connecting with the drive circuit element 6, and the leading-about secondary wiring 17 consists of wiring section 17a, extension section 17b, and connection 17c similarly.

[0023] Although the arrangement structure of the electrode means formed in drawing 3 at the substrate 2 of aforementioned another side is shown, by this gestalt, ten band-like electrodes 18 (electrode means) by the side of a horizontal train (X side) are formed in the predetermined pitch so that the center-section side of a substrate 2 may be occupied. in addition — although drawing 3 showed only ten electrodes 18 for simplification of explanation, if it is shown in an actual liquid crystal display — screen resolution — in all — dozens of— 1000 — hundreds of electrodes are arranged Moreover, the field in which the aforementioned electrode 18 is installed is made into the field inside a sealing layer 3 as shown also in drawing 1, and it is arranged so that it may become plane view matrix-like, as were shown in drawing 1 and two or more above-mentioned electrodes 13 and two or more electrodes 18 explained substrates 1 and 2 previously in the state where opposite arrangement was carried out in piles.

[0024] Next, it takes about so that it may connect with the edge of two or more electrodes 18 of the above-mentioned infestation by turns, wiring 20 is formed, it takes about so that it may connect with the edge of the remaining things of two or more electrodes 18 of the above-mentioned infestation of the left end side of the substrate 2 of another side by turns, and wiring 21 is formed in the right end section side of the substrate 2 of aforementioned another side. Connection 20a which the aforementioned leading-about wiring 20 is connected to the edge on the right-hand side of an electrode 18, and is prolonged in the longitudinal direction (the direction of X) of a substrate 2. It consists of extension section 20b prolonged to the edge of a substrate 2 in lengthwise [ of a substrate 2 ] (the direction of Y), and the leading-about wiring 21 also consists of connection 21a which is similarly connected to the edge on the left-hand side of an electrode 18, and is prolonged in the longitudinal direction of a substrate 2, and extension section 21b prolonged to the edge of a substrate 2 in lengthwise [ of a substrate 2 ]. And these leading-about wiring 20 is formed so that it may correspond with the leading-about secondary wiring 16 on the substrate 1 explained previously, and it is formed so that the previous leading-about wiring 21 may correspond with the leading-about secondary wiring 17 on the substrate 1 explained previously. namely, the leading-about secondary wiring 16 of each [ the state where opposite arrangement of the substrates 1 and 2 was carried out as shown in drawing 1 ] and each leading-about wiring 20 — a plane view simultaneously — a pile — like — the leading-about wiring 21 of each [ wiring / leading-about secondary / 17 / each ] — a plane view simultaneously — a pile — it is arranged like

[0025] Next, in the state where opposite arrangement of the aforementioned substrates 1 and 2 was carried out as shown in drawing 1, while a part of sealing layer 3 is located in the portions of connection 20a of each leading-about wiring 20, and wiring section 16a of each leading-about secondary wiring 16, a part of sealing layer 3 is located in the portions of connection 21a of each leading-about wiring 21, and wiring section 17a of each leading-about secondary wiring 17. Moreover, it mainly takes about with extension section 17b of the previous leading-about secondary wiring 17 to the frame field 8 on the left-hand side of the image display field GR, and extension section 21b of wiring 21 is arranged, it mainly takes about with extension section 16b of the previous leading-about secondary wiring 16 to the frame field 9 on the right-hand side of the image display field GR, and extension section 20b of wiring 20 is arranged.

[0026] and these substrates 1, and the portion corresponding to the frame field 8 between two and the portion corresponding to the frame field 9 — setting — the outside field (portion which gave the slash to each outside field by drawing 1) of a sealing layer 3 — a vertical flow — the member 25 intervenes these vertical flows — it comes to scatter the electric conduction particle 27 to the interior of the insulating resin layer 26 of insulation [ member / 25 ] for two or more minutes. In this electric conduction particle 27, you may use for the front face of a metal ball with a particle size of several micrometers, a conductive globular form polymer ball, and a globular form polymer ball which things, such as what gave metal coating. If substrates 1 and 2 are stuck by pressure from the state made to be placed between both frame fields 8 and 9 when make substrates 1 and 2 specifically counter, making it rival and unifying, a vertical flow will be electrically made because the extension sections 16b and 20b or the extension sections 17b and 21b which were formed in substrates 1 and 2 put the electric conduction particle 27 as shown in drawing 3. in addition, it exists in the frame fields 8 and 9 like these — lengthening — turning — the wiring sections 16a and 17a of the subwiring 16 and 17 — lengthening — turning — the extension sections 20a and 21a of wiring 20 and 21 — also setting — a vertical flow — electric connection is made by the member 25. Therefore, when plane view of the substrates 1 and 2 is carried out, it takes about with the leading-about wiring 20 which carries out phase opposite, and the vertical flow of the subwiring 16 is carried out separately electrically, it takes about with the leading-about wiring 21 which carries out phase opposite, and the vertical flow of the subwiring 17 is carried out electrically separately.

[0027] In addition, although a polarizing plate, a phase contrast board, etc. are arranged on the outside of the aforementioned substrates 1 and 2 in the case of an actual liquid crystal display. Although a back light is prepared in a substrate rear-face side when a liquid crystal display is a penetrated type, a reflecting layer is prepared when it is a reflected type, and a light filter is prepared in explanation of this operation. gestalt when it is a color display type while omitting a publication and explanation of these members. In the case of the gestalt of this operation, explanation of these components was omitted.

[0028] Like the above, when the drive circuit element 6 supplies a picture signal and a scanning signal to each electrodes 13 and 18 to predetermined timing respectively, the orientation state of the liquid crystal molecule which exists between the intersection parts of these electrodes can be controlled by these electrode 13 — and driving 18 —, and a display can be controlled by the constituted liquid crystal display A according to them. [ since ... is driven, when it is going to impress voltage to each electrode 18 ] and the electrode 18 of infestation of the drive circuit element 6 — Even if it is going to impress the same voltage as the electrode 18 in the position near the drive circuit element 6, and the electrode 18 in the position distant from the drive circuit element 6, between the drive circuit element 6 and an electrode 18 the vertical flow which exists in the frame field 8 — the vertical flow in which the vertical flow was carried out by the member 25 and which takes about, takes about with wiring 20, and exists in the subwiring 16 and the frame field 9 — the vertical flow was carried out by the member 25, since it takes about, it takes about with wiring 21 and the subwiring 17 exists. As a result which has carried out [ low \*\*\*\* ]-izing, to any electrode 18 of a position, the target voltage can be impressed certainly and can be driven rather than the structure including these which lengthens about and shows the resistance as the whole wiring to drawing 11. Therefore, also in a part of image display field GR corresponding to the electrode 18 which is separated from the drive circuit element 6, the display of a uniform luminosity can be obtained also in a part of image display field GR corresponding to the electrode 18 in the position near the drive circuit element 6. Subsequently, with the equipment of the gestalt of this operation, since the frame fields 8 and 9 of width of face, such as a simultaneously, are formed in the right-and-left both sides of the image display field GR, the frame viewing area GR can be arranged in the center section of the whole liquid crystal display.

[0029] In addition, in the form of this operation, although it lengthens about, and it lengthens about with wiring 20 and 21 and not being asked especially about each width of face of the subwiring 16 and 17, it is good also as width of face which is good also as equal width of face, and is different in these. You may adopt the structure of lengthening about and

forming wiring 20 and 21 most thickly which lengthened about gradually, formed wiring 20 and 21 thickly, and separated most from the drive circuit element 6 as it becomes the electrode 18 linked to the electrode 18 near [ when considering as different width of face ] the drive circuit element 6 which lengthened about, formed wiring 20 and 21 most thinly, and is separated from the drive circuit element 6. Moreover, it lengthens about, and lengthens about with wiring 20 and 21, and subwiring 16 and 17 can also be considered as metal wiring. Since-izing can be carried out [ low \*\*\*\* ] rather than transparent electrical conducting materials, such as ITO, when it considers as metal wiring, thinning of the width of face of wiring itself can be carried out, and further narrow picture frame-ization can be attained. Moreover, although it lengthened about and wiring 20 and 21 was connected to the electrode 18 in every other one with the form of this operation, how to make these connection does not have a limit and you may connect with it two or more [ every ].

[0030] They are the flat-surface schematic drawing showing [ showing the form of the 2nd operation, and / drawing 5's (a's)'s taking about with the flat-surface schematic drawing of the liquid crystal display of this form and drawing 5's (b's)'s taking about with the electrode of one substrate of a liquid crystal display, and ] wiring etc. with which "form of the 2nd operation" drawing 5 applied this invention to the passive matrix type liquid crystal display (electro-optics equipment), the flat-surface schematic drawing in which drawing 5's (c's)'s taking about with the electrode of the substrate of another side of a liquid crystal display, and Moreover, in order to make each class and each part material into the size of the grade which can be recognized on a drawing, scales are made to have differed for each class or every each part material in each drawing. Since the liquid crystal display B of the form of this 2nd operation is an example of the liquid crystal display of the form which made reverse wiring structure of the liquid crystal display A of the form of previous operation of the 1st by the substrate side of another side one substrate side, the same sign is given to the same component and those explanation is simplified. Furthermore, since it is equivalent to the form of the 1st operation about the structure where opposite arrangement of one substrate 31 and the substrate 32 of another side is carried out, liquid crystal is pinched among them in the form of the 2nd operation, and a sealing layer is prepared between substrates Drawing 5 (a) shows only an electrode and the important section of wiring structure, take about with the electrode of one substrate 31 in drawing 5 (b), and only the arrangement structure of wiring is explained. In drawing 5 (c), it takes about with the electrode of the substrate 32 of another side, only the arrangement structure of wiring is explained, and a publication and explanation of the detailed structure about portions, such as a sealing layer, are omitted.

[0031] As shown in drawing 5 (b), the electrode 33 of infestation is formed in one substrate 31 in a two or more predetermined pitch. In the state where one substrate 31 and the substrate 32 of another side were made to counter as the electrode 35 of a column is formed in the substrate 32 of another side in a two or more predetermined pitch as shown in drawing 5 (c), and shown in drawing 5 (a) It is constituted so that two or more electrodes 33 and two or more electrodes 35 may be arranged in the shape of a plane view matrix and may constitute the image display field GR. It connects with the right end section of the electrode 33 in every other one, and the leading-about wiring 40 for electrodes is formed in the frame field 38 on the right-hand side of the image display field GR of aforementioned one substrate 31, respectively, it connects with the left end section of the remaining electrodes 33 in every other one, and the leading-about wiring 41 is formed in the frame field 39 on the left-hand side of the image display field GR, respectively. Connection 40a which each previous leading-about wiring 40 is prolonged in a longitudinal direction along with an electrode 33 like the case of leading-about wiring of the form of previous operation of the 1st, and is connected to the edge of an electrode 33. It consists of extension section 40b prolonged in lengthwise [ of a substrate 32 ], and connection 40c which is prolonged in the longitudinal direction of a substrate 32 and is connected to the drive circuit element 6, and the leading-about wiring 41 also consists of connection 41a, extension section 41b, and connection 41c.

[0032] Next, become the frame field 38 on the right-hand side of the electrode 35 of the substrate 32 of another side shown in drawing 5 (b) from connection 40a of the previous leading-about wiring 40, wiring section 43a of an equivalent configuration, previous extension section 40b, and extension section 43b prolonged in the same direction, take about to it, and the subwiring 43 is formed in it. It also becomes the frame field 39 on the left-hand side of a substrate 32 from connection 41a of the previous leading-about wiring 41, wiring section 44a of an equivalent configuration, previous extension section 41b, and extension section 44b prolonged in the same direction, and takes about to it, and the subwiring 44 is formed in it. therefore, the state where opposite arrangement of the substrates 31 and 32 was carried out as shown in drawing 5 (a) — setting — taking about — wiring 40 — taking about — the subwiring 43 — a plane view lap and the leading-about wiring 41 — taking about — the subwiring 44 — plane view — a pile — it is formed like and the vertical flow arranged like the case of the form of previous operation of the 1st among the frame fields 38 and 39 of the both sides of these substrates 31 and 32 — it takes about by the member 25, and takes about with wiring 40, and the subwiring 43 flows — having — the leading-about wiring 41 — taking about — the subwiring 44 — a vertical flow — it has flowed by the member 25 moreover, the connection wiring 47 to which two or more connection wiring 45 which extended to the edge side of a substrate 31 was formed in while connecting with each electrode 35 at the soffit section side of the electrode 35 of the column of the substrate 32 of another side, and these connection wiring 45 was connected to the drive circuit element 6 of the 1st previous substrate 31 — a vertical flow — it connects through the member 48

[0033] Also in the liquid crystal display B which has the substrates 31 and 32 of the structure shown in drawing 5 (a), the operation effect equivalent to the liquid crystal display A of the form of previous operation of the 1st can be acquired. That is, like the above, in the liquid crystal display constituted, when the drive circuit element 6 supplies a picture signal and a scanning signal to each electrodes 33 and 35 to predetermined timing respectively, the orientation of the liquid crystal which exists in inter-electrode [ these ] can be controlled by driving these electrodes, and a display can be controlled by it. [ since ... is driven, when it is going to impress voltage to each electrode 33 ] and the electrode 33 of infestation of the drive circuit element 6 — Even if it impresses voltage to the electrode 33 in the position near the drive circuit element 6, and the electrode 33 in the position distant from the drive circuit element 6, between the drive circuit element 6 and an electrode 33 the vertical flow which exists in the frame field 38 — the vertical flow was carried out by the member 25 — taking about — wiring 40 — taking about — the subwiring 43 — or the vertical flow which exists in the frame field 39 — the vertical flow was carried out by the member 25 since it takes about it.

and the subwiring 44 exists As a result which has carried out [ low \*\*\*\* ]-izing, to any electrode 33 of a position, the target voltage can be impressed certainly and can be driven rather than the structure which shows these wiring resistance in drawing 11 . therefore, a part of image display field GR in which the electrode 33 which is separated from the drive circuit element 6 is located — a uniform luminosity can be obtained to a side Subsequently, since the frame fields 38 and 39 of width of face, such as a simultaneously, are formed in the right-and-left both sides of an image display field, about the point that the frame viewing area GR can be arranged in the center section of the whole liquid crystal display, the same effect as the form of previous operation of the 1st can be acquired.

[0034] "Gestalt of the 3rd operation" drawing 6 is the plan which applied this invention to the passive matrix type liquid crystal display (electro-optics equipment) and in which showing the gestalt of the 3rd operation. Moreover, in order to make each class and each part material into the size of the grade which can be recognized on a drawing, scales are made to have differed for each class or every each part material in drawing 6 . the liquid crystal display C of the gestalt of this 3rd operation — the wiring structure of the liquid crystal display A of the gestalt of previous operation of the 1st, and abbreviation — although it is the same, it is one gestalt of the structure which extended the formation position of a sealing layer widely, prepared it to the frame field, and gave the vertical flow function to the sealing layer In addition, in the g stalt of the 3rd operation, opposite arrangement of one substrate 1 and the substrate 2 of another side is carried out, liquid crystal is pinched among them, and since it is equivalent to the gestalt of the 1st operation about the structure where a sealing layer is prepared between substrates, explanation of those portions is omitted.

[0035] In the gestalt of this 3rd operation, it considers as the structure in which it came to distribute an electric conduction particle inside a sealing layer 53, and the sealing layer 53 served as the vertical flow member. That is, extended formation of the sealing layer 53 is carried out so that it may have the extension sections 53A and 53B which extend to a substrate 1 and the frame fields 8 and 9 of right and left of two. Since it is equivalent to the liquid crystal display A of the gestalt of previous operation of the 1st about the structure of other portions, the same sign is given to the same portion and explanation of these same portions is omitted.

[0036] Also in the liquid crystal display C which has the substrates 1 and 2 and sealing layer 53 of the structure shown in drawing 6 , the operation effect equivalent to the liquid crystal display A of the gestalt of previous operation of the 1st can be acquired. That is, like the above, in the liquid crystal display C constituted, when the drive circuit element 6 supplies a picture signal and a scanning signal to each electrodes 13 and 18 to predetermined timing respectively, the orientation of the liquid crystal which exists in inter-electrode [ these ] can be controlled by driving these electrodes, and a display can be controlled by it. [ since ... is driven, when it is going to impress voltage to each electrode 18 ] and the electrode 18 of infestation of the drive circuit element 6 — Even if it impresses the same voltage as the electrode 18 in the position near the drive circuit element 6, and the electrode 18 in the position distant from the drive circuit element 6, between the drive circuit element 6 and an electrode 18 It takes about with the leading-about wiring 20 in which the vertical flow was carried out by sealing layer 53A which exists in the frame field 8. The subwiring 16, Or since it takes about with the leading-about wiring 21 in which the vertical flow was carried out by sealing layer 53B which exists in the frame field 9 and the subwiring 17 exists As a result which has carried out [ low \*\*\*\* ]-izing, to any electrode 18 of a position, the target voltage can be impressed certainly and can be driven rather than the structure which shows these wiring resistance in drawing 11 . Therefore, also in a part of image display field GR in the electrode 18 of the position distant from the drive circuit element 6, the display of the same luminosity can be obtained also in a part of image display field GR corresponding to the electrode 18 near the drive circuit element 6. Subsequently, since the frame fields 8 and 9 of width of face, such as a simultaneously, are formed in the right-and-left both sides of an image display field, the image display field GR can be arranged in the center section of the whole liquid crystal display. In this case, since it takes about with the leading-about wiring 20 and 21, the vertical flow of the subwiring 16 and 17 is formed and simplification of a manufacturing process can be achieved while forming the sealing layer 53 of drawing 6 , there is an effect which lowers the manufacturing cost of the whole equipment. Moreover, although a regular cell gap is enacted and manufactured, scattering balls, such as a silica (SiO<sub>2</sub>) called gap agent, and putting a pressure on substrates 1 and 2 in order to control the thickness of a liquid crystal layer uniformly, on balls, such as this silica, light is uncontrollable by the liquid crystal display. For this reason, although it is necessary to scatter many gap agents when it is going to obtain a uniform gap (thickness of a liquid crystal layer), display grace is dropped, so that it scatters mostly. The gap agent of the image display field GR can be reduced by mixing this gap agent with the sealing layer 53 with the electric conduction particle 27. By this, the optical regulatory region of the image display field GR becomes large, and can give a high-definition indication. In the liquid crystal display applied to a cellular phone etc., the image display field GR is small and the thickness precision of liquid crystal layer sufficient by the gap agent of only a sealing layer can be secured, without winding a gap agent around this field. In this case, the manufacturing process which sprinkles a gap agent is also skipped and it can be further made a low cost.

[0037] drawing 7 shows the form of operation of the 4th of the liquid crystal display (electro-optics equipment) concerning this invention, and shows the structure which did not form leading-about wiring in the right-and-left both sides of the image display field GR equally, but established only left-hand side a drawing — only in the unilateral in this form The frame field 8 where the liquid crystal display (electro-optics equipment) D of the form of this 4th operation was formed in the right-hand side of a sealing layer 3 with the form of previous operation of the 1st is omitted, and is formed instead more broadly than the form of previous operation of the 1st of the frame field 58 on the left-hand side of a sealing layer 3. And it lengthens about, and wiring 21 is formed in the form which should be connected to the electrode 18 of infestation and which is separately connected to the all electrodes 18 instead of an electrode 18 in every other one, is similarly drawn about, and also about the subwiring 17, it lengthens about and it is formed in all the forms corresponding wiring 21. Instead, it lengthens about in the frame field on the right-hand side of the image display field GR, and lengthens about with wiring, and subwiring is not formed. About other structures, it is equivalent to the structure of the form of previous operation of the 1st.

[0038] In the liquid crystal display D which lengthens about with the frame field 58 of the structure shown in drawing 7

lengthens about with wiring 17, and has the subwiring 21, although the image display field GR cannot be arranged in an equipment center section, except for it, the operation effect equivalent to the liquid crystal display A of the gestalt of previous operation of the 1st can be acquired. [ since ... is driven, when it is going to impress voltage to each electrode 18 ] namely, the electrode 18 of infestation of the drive circuit element 6 — Even if it impresses voltage to the electrode 18 in the position near the drive circuit element 6, and the electrode 18 in the position distant from the drive circuit element 6, between the drive circuit element 6 and an electrode 18 the vertical flow which exists in the frame field 58 — the vertical flow was carried out by the member 25, since it takes about, it takes about with wiring 21 and the subwiring 17 exists. As a result which has been carried out [ low \*\*\*\* ]-izing, to any electrode 18 of a position, the target voltage can be impressed certainly and can be driven rather than the structure which shows wiring resistance in drawing 11. Therefore, also in the image display field GR distant from the drive circuit element 6, a uniform luminosity can be obtained also in the image display field GR near the drive circuit element 6.

[0039] By the way, although the example which applied this invention to the passive matrix type liquid crystal display in the gestalt of old operation was explained, of course, you may apply this invention to the active-matrix type liquid crystal display (electro-optics equipment) which makes a two terminal type alignment element a switching device. Drawing 8 is what shows the important section of the wiring circuit of the image display field of the active-matrix type liquid crystal display which makes a switching device a two terminal [ this kind of ] type alignment element. In this gestalt, opposite arrangement of the substrate 62 by the side of an element is carried out through a regular cell gap to the substrate 61 by the side of opposite. The liquid crystal of illustration abbreviation is enclosed between both the substrates 61 and 62, and it considers as the composition in which two or more band-like scanning electrodes (electrode means) 64 were formed in the predetermined pitch at the substrate 61 by the side of opposite.

[0040] Moreover, an insulator layer 71, two or more signal lines 72 formed in the predetermined pitch, and two or more thin film diode 73 grades are formed in the substrate 62 by the side of an element. Among these, the aforementioned signal line 72 is arranged so that it may intersect perpendicularly with the previous scanning electrode 64 in a predetermined pitch. Two or more pixel electrodes (electrode means) 74 are arranged between the adjoining scanning electrodes 64, and let the field two or more previous scanning electrodes 64 and two or more signal lines 72 carry out [ the field ] plane view intersection be an image display field. Furthermore, the previous thin film diode 73 is equipped with element section 74a of the shape of a piece installed in the pixel electrode 74 side from the scanning line 72, and the insulator layer is formed on element section 74a. And so that the element section 74a concerned may be covered, and as it laps with the pixel electrode 74 in part, the electric conduction film 75 is formed. In addition, although a light filter, a black matrix, etc. are formed in the substrate 61 side by the side of opposite when a liquid crystal display is a color display correspondence type, these portions are omitted in drawing 8.

[0041] since it connects with the drive circuit element by which two or more scanning electrodes (electrode means) 64 are formed in a predetermined pitch also in the liquid crystal display constituted as mentioned above, and each scanning electrode 64 is formed on a substrate, it connects with the edge of the scanning electrode 64 — it lengthens about and this invention structure can be applied like the case of the gestalt of previous operation of the 1st to wiring. Namely, two or more electrodes 18 shown in drawing 1 are judged the scanning electrode 64 with the gestalt of this operation. If it connects by the vertical flow member in which wiring is formed and it lengthens about to the frame field of a substrate 62, and subwiring is formed, and it lengthens about, and lengthens [ it lengthens about to the frame field of a substrate 61, and ] about with wiring, and subwiring is formed between the frame fields of both the substrates 61 and 62. It can lengthen about, low resistance-ization of wiring can be made, and the same effective voltage as the electrode in the position distant from the drive circuit element like the case where it is the 1st previous operation gestalt, and the electrode in the position near a drive circuit element can be impressed.

[0042] (Operation gestalt of electronic equipment) next, aforementioned the 1- the example of electronic equipment equipped with either of the liquid crystal displays (electro-optics equipment) of the 5th operation gestalt is explained. Drawing 9 (a) is the perspective diagram having shown an example of a cellular phone. In drawing 9 (a), a sign 500 shows the main part of a cellular phone, and the sign 501 shows the liquid crystal display section using either of the aforementioned liquid crystal displays. Drawing 9 (b) is the perspective diagram having shown an example of carried type information processors, such as a word processor and a personal computer. In drawing 9 (b), the liquid crystal display section for which the sign 600 used the information processor for and the sign 601 used either of the liquid crystal displays of the above [ the input sections, such as a keyboard, and a sign 603 / the main part of an information processor and a sign 602 ] is shown. Drawing 9 (c) is the perspective diagram having shown an example of wrist watch type electronic equipment. In drawing 9 (c), a sign 700 shows the main part of a clock, and the sign 701 shows the liquid crystal display section using either of the aforementioned liquid crystal displays. Drawing 9 (a) Since each electronic equipment shown in - (c) is equipped with the liquid crystal display section using either of the aforementioned liquid crystal displays, it has the uniform display gestalt of a luminosity, and a frame field is equal to right and left of an image display field, is narrow, and, moreover, becomes the high thing of display quality.

[0043]

[Effect of the Invention] Since it is formed according to this invention so that the substrate in which takes about with leading-about wiring to the frame field of the outside of an image display field, and subwiring carries out phase opposite may be countered as explained above, and they are connected by the vertical flow member, it lengthens about, and wiring resistance can be reduced rather than it wires by the wiring independent. Therefore, according to this invention structure, even if a drive circuit means impresses a signal to which scanning electrode means or signal-electrode means of a position of an image display field, it is rare to cause \*\*\*\* of a signal wave form, and it has the feature whose display is possible, without producing the nonuniformity of a luminosity.

[0044] According to this invention, an image display field can be arranged in the center section of equipment by the frame field of width of face [ both sides / right-and-left / of the aforementioned image display field ] being formed. Moreover, it is rare to cause \*\*\*\* of a signal wave form like the point on it, and the electro-optics equipment whose display is possible

can be offered, without producing the nonuniformity of a luminosity.

[0045] Although what specifically scattered the electric conduction particle to the interior of an insulating resin layer for two or more minutes is applicable as a vertical flow member according to this invention, if it is the thing of this structure, what is generally widely used as vertical flow material for liquid crystal displays etc. can be used. A vertical flow member is put by the substrate of a couple, it pushes mutually, an internal electric conduction particle is lengthened about, and a vertical flow is easily completed by wiring or lengthening about and putting with subwiring.

[0046] While considering as the frame field in which a part of field in which the sealing layer was prepared is taken about in this invention, it takes about with wiring, and subwiring is formed, two or more electric conduction particles can be distributed inside the aforementioned sealing layer, and it can take about by these electric conduction particle, and can take about with wiring, a vertical flow can be carried out in subwiring, and the composition as which a vertical flow member is served by the sealing layer can be adopted.

[0047] If the width of face of the leading-about wiring for [ far in position from a drive circuit means ] electrode meanses makes thick than the width of face of the leading-about wiring for [ near a drive circuit means in position ] electrode meanses, in this invention, the display of an equal luminosity can perform to a drive circuit means also to the electrode means of which position which lengthens about, can make wiring resistance of wiring low, and exists in an image-display field to an electrode means far in position.

[0048] Even if the aforementioned signal-electrode means can apply this invention also to the composition which comes to provide 2 terminal type nonlinear element arranged between the pixel electrode section formed for every pixel, and the aforementioned signal-wiring section and the aforementioned pixel electrode section and a drive circuit means impresses a signal to the electrode means of which position of an image-display field, the equipment whose display is possible can offer without producing the nonuniformity of a luminosity.

[0049] Since it is characterized by the electronic equipment of this invention equipping one of the above with the electro-optics equipment of a publication as a display means, it has the feature which can perform the display without the nonuniformity of a luminosity.

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[Translation done.]

**\* NOTICES \***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] Drawing 1 is the plan concerning this invention showing the outline structure of the liquid crystal display of the gestalt of the 1st operation.

[Drawing 2] Drawing 2 is the plan showing one substrate of this liquid crystal display.

[Drawing 3] Drawing 3 is the perspective drawing showing the substrate of another side of this liquid crystal display.

[Drawing 4] Drawing 4 takes about with leading-about wiring of this liquid crystal display, and is the cross section for a connection of subwiring.

[Drawing 5] Drawing 5 is a thing for [ concerning this invention ] explaining the liquid crystal display of the gestalt of the 2nd operation, and they are the flat-surface schematic drawing in which drawing 5's (a's)'s taking about with the outline plan of a liquid crystal display, and drawing 5's (b's)'s taking about with the electrode of one substrate, and showing wiring, and the perspective drawing in which drawing 5's (c's)'s taking about with the electrode of the substrate of another side, and showing wiring.

[Drawing 6] Drawing 6 is the plan concerning this invention showing the outline structure of the liquid crystal display of the gestalt of the 3rd operation.

[Drawing 7] Drawing 7 is the plan concerning this invention showing the outline structure of the liquid crystal display of the gestalt of the 4th operation.

[Drawing 8] Drawing 8 is the fragmentary sectional view concerning this invention showing the outline structure of the image display field of the substrate of the liquid crystal display of the form of the 5th operation.

[Drawing 9] Drawing 9 shows the example of application of electronic equipment equipped with the electro-optics equipment concerning this invention, and drawing 9 (a) is [ the perspective diagram of a personal digital assistant and drawing 9 (c) of the perspective diagram of a cellular phone and drawing 9 (b) ] the perspective diagrams of wrist watch type electronic equipment.

[Drawing 10] Drawing 10 shows an example of the conventional liquid crystal display, and the plan and drawing 10 (b) which show the arrangement structure of an electrode where drawing 10 (a) has been arranged in the shape of a matrix are a cross section.

[Drawing 11] Drawing 11 is the plan showing an example of the liquid crystal display which this invention persons have proposed.

**[Description of Notations]**

GR Image display field

1 Two Substrate

3 Sealing Layer

6 Drive Circuit Element (Drive Circuit Means)

8 Nine Frame field

13 18 Electrode (electrode means)

16 17 It lengthens about and is subwiring.

20 21 It lengthens about and wires.

25 Vertical Flow — Member

26 Insulating Resin Layer

27 Electric Conduction Particle

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[Translation done.]